AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES
	1 of 2

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. *(If applicable)*
3	26-Jul-2002		

6. ISSUED BY CODE

US Army Corps of Engineers, Kansas City District
760 Federal Building, 601 East 12th Street
Kansas City, Missouri 64106-2896

7. ADMINISTERED BY *(If other than item 6)* CODE

8. NAME AND ADDRESS OF CONTRACTOR *(No.,street, county, State and ZIP Code)*

CODE FACILITY CODE

(x) 9a. AMENDMENT OF SOLICITATION NO.

X DACW41-02-B-0008

9B. DATED *(SEE ITEM 11)*

6/13/2002

10A. MODIFICATION OF CONTRACT/ORDER NO.

10B. DATED *(SEE ITEM 13)*

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

[X] The above number solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers [ ] is extended, [X] is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitaiton or as amended, by one of the following methods: (a) By completing Items 8 and 15, and returning_____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegraph which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA *(If required)*

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

(x) A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: *(Specify authority)* THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.

B. THE ABOVE NUMBER CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES *(such as changes in paying office, appropriation date, etc.)* SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF:

C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:

D. OTHER *(Specify type of modification and authority)*

E. IMPORTANT: Contractor [ ] is not, [ ] is required to sign this document and return copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION *(Organized by UCF section headings, including solicitation/contract subject matter where feasible.)*

Marysville Levee and Railroad Relocation Project, Big Blue River, Kansas

The Solicitation is amended in accordance with the attached pages.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER *(Type or print)*		16A. NAME AND TITLE OF CONTRACTING OFFICER *(Type or print)*	
15B. CONTRACTOR/OFFEROR _____ *(Signature of person authorized to sign)*	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY _____ *(Signature of Contracting Officer)*	16C. DATE SIGNED

The SOLICITATION is amended as follows:

1. SPECIFICATIONS:

Revised Paragraphs: The following changes are made as indicated. Pages containing the revised paragraphs are attached.

Section 01500, paragraph titled “Resident Engineer's Office “ is changed to add the following: “T-1 Line: Point to point T-1 line from both computers to DEMARC at 601 E. 12th Street, Room 868, Kansas City, MO 64106.”

Section 02331, paragraph titled “Compaction of Random Fill” is changed to add the following: “-STA 7845+00 (1000’RT) +/- to STA 7855+00 (400’RT) +/- (includes only fill placed for grading of existing railroad embankment.)”

NOTICE: Sections 01500 and 02331 are being re-issued in their entirety because revisions in this and other amendments have caused re-pagination in the pages following the revisions.

2. DRAWINGS: The following drawings are deleted and replaced with revised drawings of the same numbers. Copies of the revised drawings are attached.

C3.4
C3.9
C4.15
C4.16
C6.15

3. Bidders are required to acknowledge receipt of this amendment on the Bidding Form, in the space provided, or by separate letter or telegram prior to opening of bids. Failure to acknowledge all amendments may cause rejection of the bid.

4. Bids will be received until 2:00 p.m., local time, 6 August 2002, in Room 760 Federal Building, 601 E. 12th Street, Kansas City, Missouri 64106-2896. and at that time publicly opened.

Encls
1. Spec pgs as listed

SECTION 01500

TEMPORARY FACILITIES AND CONTROLS
09/01

PART 1 GENERAL

1.1 REFERENCE

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C511	(1997) Reduced-Pressure Principle Backflow Prevention Assembly

FOUNDATION FOR CROSS-CONNECTION CONTROL AND HYDRAULIC RESEARCH (FCCCHR)

FCCCHR-CCC	Manual of Cross-Connection Control
FCCCHR-USC	List of Approved Backflow Prevention Assemblies

U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)

FHWA MUTCD	(1988) Manual on Uniform Traffic Control Devices

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(1999) National Electrical Code
NFPA 241	(1996) Safeguarding Construction, Alteration, and Demolition Operations

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330, SUBMITTAL PROCEDURES.

SD-01 Preconstruction Submittals

Traffic control plan; G- RE;
Copy KCD-GL, KDOT, UPRR, KM, HWS

Construction site plan; G- RE;
Copy KCD-GL, KDOT,UPRR, KM, HWS

1.3 CONSTRUCTION SITE PLAN

Prior to the start of work, submit a site plan showing the locations of temporary facilities (including layouts and details, equipment and material

storage area (onsite and offsite), and access and haul routes used for this contract. Show locations of safety and construction fences, avenues of ingress/egress to the fenced area and details of the fence installation,site trailers and quantity, construction entrances, trash dumpsters, temporary sanitary facilities, and worker parking areas.

1.4 TEMPORARY UTILITIES

The Contractor shall pay all costs incurred in connecting, converting, and transferring the utilities to the work. The Contractor shall make connections, including providing meters; and providing transformers; and make disconnections. Under no circumstances will taps to base fire hydrants be allowed for obtaining domestic water.

1.4.1 Contractor Utilities

The Contractor shall provide his own utilities.

1.4.2 Building and Site Storm Protection

When a warning of gale force winds is issued, take precautions to minimize danger to persons, and protect the work and nearby Government property. Precautions shall include, but are not limited to, closing openings; removing loose materials, tools and equipment from exposed locations; and removing or securing scaffolding and other temporary work. Close openings in the work when storms of lesser intensity pose a threat to the work or any nearby Government property.

1.5 STATION OPERATION AFFECT ON CONTRACTOR OPERATIONS

1.5.1 Interruption of Vehicular Traffic

If during the performance of work, it becomes necessary to modify vehicular traffic patterns at any locations, notify the Contracting Officer at least 30 calendar days prior to the proposed modification date, and provide a Traffic Control Plan detailing the proposed controls to traffic movement for approval. The plan shall be in accordance with State and local regulations and the FHWA MUTCD, Part VI. Provide cones, signs, barricades, lights, or other traffic control devices and personnel required to control traffic.

1.6 STORAGE AREAS

Contractor shall be responsible for security of his property. The contractor shall construct a temporary 6 foot high chaing link fence around trailers and materials. The fence shall include plastic strip inserts, colored brown, so that visibility through the fence is obstructed. Fence posts may be driven, in lieu of concrete bases, where soil conditions permit. Trailers, equipment or materials shall not be placed or stored outside the fenced area unless such trailers, materials, or equipment are assigned a separate and distinct storage area by the Contracting Officer. Trailers, equipment, or materials shall not be open to public view with the exception of those items which are in support of ongoing work on any given day. Materials shall not be stockpiles outside the fence for the next days work.The Contract Clause entitled "FAR 52.236-10, Operations and Storage Areas" and the following apply:

1.6.1 Storage Size and Location

The open site available for storage shall be as indicated. The storage area shall be located approximately at STA 7790+00 as shown on plans .

1.7 TEMPORARY SANITARY FACILITIES

Provide adequate sanitary conveniences of a type approved for the use of persons employed on the work, properly secluded from public observation, and maintained in such a manner as required and approved by the Contracting Officer. Maintain these conveniences at all times without nuisance. Upon completion of the work, remove the conveniences from the premises, leaving the premises clean and free from nuisance. Dispose of sewage through connection to a municipal, district, or station sanitary sewage system. Where such systems are not available, use chemical toilets or comparably effective units, and periodically empty wastes into a municipal, district, or station sanitary sewage system, or remove waste to a commercial facility. Include provisions for pest control and elimination of odors. Provide temporary sewer and sanitation facilities that are self-contained units with both urinals and stool capabilities. Ventilate the units to control odors and fumes and empty and clean them at least once a week or more often if required by the Contracting Officer. The doors shall be self-closing. Locate the facility behind the construction fence or out of the public view.

1.8 TEMPORARY BUILDINGS

Temporary facilities (including trailers) shall be in like new condition. Locate these facilities where directed and within the indicated operations area. Storage of material/debris under such facilities is prohibited. Contractor shall be responsible for the security of the stored property.

1.8.1 Maintenance of Temporary Facilities

Suitably paint and maintain the temporary facilities. Failure to do so will be sufficient reason to require their removal.Fencing shall be kept in a state of good repair and proper alignment. Should the Contractor elect to traverse, with construction equipment or other vehicles, grassed or unpaved areas which are not established roadways, such areas shall be covered with a layer of gravel as necessary to prevent rutting and the tracking of mud onto paved or established roadways; gravel gradation shall be at the Contractor's discretion. Grass located within the boundaries of the construction site and all storage areas shall be mowed for the duration of the project. Grass and vegetation along fences, buildings, under trailers, and in areas not accessible to mowers shall be edged or trimmed neatly. At no time shall the height of the grass exceed 4-inches. Weeds shall be controlled and not exceed grass height.

1.8.2 Resident Engineer's Office

The Contractor shall furnish a temporary office facility approximately 12 feet by 70 feet with a minimum of 840 square feet of floor space. It shall be located where directed and shall be reserved for Government personnel only. Gravel parking area for a minimum of four vehicles will be provided and reserved for the sole use of the Government. Access from the parking area to the office shall be by elevated walkway or concrete sidewalks. The steps and landings at the doors shall be substantial.

The office facility and parking area shall be fenced with 6-foot chain link fence and triple strand barbed wire top. A minimum of 15-foot clearance

shall be provided between the fencing and the trailer. Security lighting on poles around the site shall be provided to ensure site is well lighted during the night.

The Contractor shall furnish bottled drinking water, thermostatically controlled space heat, ventilation, and air conditioning, electric light (suitable for an office environment), sufficient power, and toilet facilities consisting of one lavatory, one water closet, one urinal. The toilet shall be complete with hot and cold running potable water, sewer, and powered bathroom ventilation.

Utilities shall be connected and disconnected by the Contractor in accordance with local codes and to the satisfaction of the Contracting Officer. The facility shall be laid out and furnished as follows:

There shall be two private offices, one at each end furnished with two desks each, two office chairs each, two four-drawer legal size file cabinets each, one telephone instrument, one computer, and one printer. The center area between the offices shall be a conference area furnished with a conference table and chairs for ten persons, three four drawer legal-size file cabinets, a table for the fax machine, a digital fax machine, a copying machine that is 11 x 17 capable, a mobile plan rack, and a movable plan table large enough to accommodate full scale drawings. The required phone lines shall be extended to both offices (phone and data) and one corner location (phone, data, and fax) in the conference room. Three telephone instruments shall be provided. The two in the offices shall be desk or wall mounted. The instrument in the conference room shall be cordless.

The minimum configuration for the two computers is:

Base Unit:
OptiPlex GX240, Pentium 4, 1.7GHz, 256K Cache, Gray Small Minitower Base, IncludesPCI Riser (220-5727)

Memory:
512MB, NonECC, PC133 SDRAM, 2X256, GX240 (311-1471)

Keyboard:
Dell Enhanced Quiet Key PS/2 Rubberdome "3 Hot key" Keyboard, Gray, OptiPlex (310-0762)

Monitor:
Dell P992, AG Trinitron, 17.9 Inch Viewable Image Size, Optiplex, Gray (320-1729)

Video Card:
32MB, ATI, Rage Ultra 128, Video Card, (Full Height), GX240 (320-1734)

Hard Drive:
40GB EIDE, 7200 RPM, ATA/100 Hard Drive, GX240 (340-3585)

Floppy Disk Drive:
3.5 inch, 1.44MB, Floppy DriveOptiplex (340-2901)

Operating System:
Windows 2000,SP1,FAT32,CD, English (420-0259)

Mouse:

Microsoft PS/2 IntelliMouse, 1.3A, OptiPlex, Gray (310-8273)

NIC:
Integrated 10/100 3Com Remote Wake-up NIC, OptiPlex (430-4061)

Modem:
Dell V.90 PCI Data/Fax Controllerless Modem for Windows 56K (313-4411)

T-1 Line:
Point to point T-1 line from both computers to DEMARC at 601 E. 12th Street, Room 868, Kansas City, MO 64106.

CD-ROM or DVD-ROM Drive:
48X CD-ROM,EIDE,Small Desktop or Minitower, OptiPlex GX240 (313-0845)

Sound Card:
Integrated Sound Blaster Compatible AC97 Sound, OptiPlex (313-8170)

Speakers:
Harman/Kardon 19.5 Speakers, Optiplex, Gray (313-1490)

Documentation Diskette:
OptiPlex Resource CD (313-7168)

Additional Storage Products:
16X Max CD-Rewriteable, 2nd Drive, GX150/240 Small Minitower (313-6005)

Additional Software:
Microsoft® Office XP Professional GSAXPPR - [416-1764][416-1709][416-0649]
NORTON SYSTEM WORKS PROFESSIONAL 2002 and NORTON INTERNET SECURITY 2002
Microstation J
Inroads Version 8.2

The minimum printer configuration is: Hewlett Packard 1200se or approved equal.

Used furniture and equipment (except computers and printers), in good condition, will be acceptable subject to approval of the Contracting Officer. Computers and printers shall be new.

The main entrance shall be into the conference room. The second egress shall be a door in either of the offices. Entrance and egress doors shall be equipped with substantial locks.

The Contractor shall provide janitorial service and janitorial consumables, fuel for the heating facilities, electricity, telephone, unlimited internet access, copier, fax and printer consumables including but not limited to toner cartridges and paper, hot and cold running domestic water, and bottled water all at no cost to the Government. The Contractor will not be liable for Government placed long distance telephone calls.

The entire facility including the furniture and equipment will remain the property of the Contractor and shall be removed from the site at the completion of the work.

1.8.3 Quality Control Manager Records and Field Office

Provide on the jobsite an office with approximately 200 square feet of

useful floor area for the exclusive use of the QC Manager. Provide a weathertight structure with adequate heating and cooling, toilet facilities, lighting, ventilation, a 4 by 8 foot plan table, a standard size office desk and chair, computer station, and working communications facilities. Provide either a 1,500 watt radiant heater and a window-mounted air conditioner rated at 9,000 BTUs minimum or a window-mounted heat pump of the same minimum heating and cooling ratings. Provide a door with a cylinder lock and windows with locking hardware. Make utility connections. Locate as directed . File quality control records in the office and make available at all times to the Government. After completion of the work, remove the entire structure from the site.

1.8.4 Trailers or Storage Buildings

Trailers or storage buildings will be permitted, where space is available, subject to the approval of the Contracting Officer. The trailers or buildings shall be in good condition, free from visible damage rust and deterioration, and meet all applicable safety requirements. Trailers shall be roadworthy and comply with all appropriate state and local vehicle requirements. Failure to maintain storage trailers or buildings to these standards shall result in the removal of non-complying units at the Contractor's expense. A sign not smaller than 24 by 24 inches shall be conspicuously placed on the trailer depicting the company name, business phone number, and emergency phone number. Trailers shall be anchored to resist high winds and must meet applicable state or local standards for anchoring mobile trailers.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 TEMPORARY PHYSICAL CONTROLS

3.1.1 Access Controls

3.1.1.1 Temporary Barricades

Contractor shall provide for barricading around all work areas to prevent public access.

3.1.1.2 Fencing

Fencing shall be provided along the construction site at all open excavations and tunnels to control access by unauthorized people. The safety fencing shall be a high visibility orange colored, high density polyethylene grid or approved equal, a minimum of 42 inches high, supported and tightly secured to steel posts located on maximum 10 foot centers.Fencing must be installed to be able to restrain a force of at least 250 pounds against it.

3.1.1.3 Plant Communication

The Contractor shall furnish three phone lines (telephone, fax, data) to the Corps of Engineers Site Office. The telephone line shall be "full service" including long distance capabilities. The fax line shall be "full service" including long distance capabilities. The data line shall be data

quality and capable of data transmission in excess of 50K. Unlimited internet access shall be provided on the data lines in all three locations.

3.1.1.4 Cellular Phones

The contractor shall furnish four cellular phones for the Contracting Officer's use throughout the duration of construction. The contractor shall also furnish a service plan for each cell phone. The service plan for each phone shall provide a minimum of 500 monthly minutes with no additional roaming or long distance charges to the government.

3.1.1.5 Signs

Place warning signs at the construction area perimeter designating the presence of construction hazards requiring unauthorized persons to keep out. Signs must be placed on all sides of the project, with at least one sign every 1000 feet. All points of entry shall have signs designating the construction site as a hard hat area.

3.1.1.6 Project and Safety Signs

The requirements for the signs, their content, and location shall be as shown on the drawings. The signs shall be erected within 15 days after receipt of the notice to proceed. The data required by the safety sign shall be corrected daily, with light colored metallic or non-metallic numerals. Upon completion of the project, the signs shall be removed from the site.

3.1.1.7 Bulletin Board

Immediately upon beginning of work, the Contractor shall provide a weatherproof glass-covered bulletin board not less than 36 by 48 inches in size for displaying the Equal Employment Opportunity poster, a copy of the wage decision contained in the contract, Wage Rate Information poster, and other information approved by the Contracting Officer. The bulletin board shall be located at the project site in a conspicuous place easily accessible to all employees, as approved by the Contracting Officer. Legible copies of the aforementioned data shall be displayed until work is completed. Upon completion of work the bulletin board shall be removed by and remain the property of the Contractor.

3.1.1.8 Traffic Work

All work around/involving roadways, to include roadway excavations and utility crossings, will be conducted in accordance with the Manual on Uniform Traffic Control Devices. Contractors shall provide and ensure appropriate road closure and detour signs are established as necessary for motor traffic management. All road closures shall be coordinated with the Contracting Officer in advance. Self-illuminated (lighted) barricades shall be provided during hours of darkness. Brightly-colored (orange) vests are required for all personnel working in roadways. Road closures shall require a road closure plan showing the location of signage.

3.1.1.9 Haul Roads

The Contractor shall, at its own expense, construct access and haul roads necessary for proper prosecution of the work under this contract. Haul roads shall be constructed with suitable grades and widths; sharp curves,

blind corners, and dangerous cross traffic shall be avoided. The Contractor shall provide necessary lighting, signs, barricades, and distinctive markings for the safe movement of traffic. The method of dust control, although optional, shall be adequate to ensure safe operation at all times. Location, grade, width, and alignment of construction and hauling roads shall be subject to approval by the Contracting Officer. Lighting shall be adequate to assure full and clear visibility for full width of haul road and work areas during any night work operations. Upon completion of the work, haul roads designated by the Contracting Officer shall be removed.

3.2 TEMPORARY WIRING

Provide temporary wiring in accordance with NFPA 241 and NFPA 70, Article 305-6(b), Assured Equipment Grounding Conductor Program. Program shall include frequent inspection of all equipment and apparatus.

3.3 CLEAN UP

Construction debris, waste materials, packaging material and the like shall be removed from the work site daily. Any dirt or mud tracked onto paved or surfaced roadways shall be cleaned away as soon as it is deposited. Salvageable materials resulting from demolition activities shall be stored within the fenced area described above or at the supplemental storage area. Stored material not in trailers, whether new or salvaged, shall be neatly stacked when stored, elevated from the ground contact on cribbing, and protected from the weather.

3.4 RESTORATION OF STORAGE AREA

Upon completion of the project and after removal of trailers, materials, and equipment from within the fenced area, the fence shall be removed and will become the property of the Contractor. Areas used by the Contractor for the storage of equipment or material, or other use, shall be restored to the original or better condition. Gravel used to traverse grassed areas shall be removed and the area restored to its original condition, including top soil and seeding as necessary.

-- End of Section --

02331

LEVEE CONSTRUCTION AND EARTHWORK
08/99

PART 1 GENERAL

1.1 SCOPE

The work covered by this section consists of furnishing all submittals, labor, equipment, materials, incidentals, and all efforts necessary to perform levee construction and general earthwork as defined for this project including excavation of borrow areas and for all other excavations incidental to the construction of embankments, channels, ditches, structures, and ponding areas as shown; foundation preparation and the construction of embankments, including the new levee, railroad, and road berm, enlargement of the existing levee, backfill of inspection trenches, berms, road crossings, backfill at drainage structures, and other incidental earthwork that may be necessary to complete the project as specified herein and as shown on the drawings. All work under this section shall comply with the requirements of EM 385-1-1. This section shall govern if there is disagreement with or between specification sections or plan sheets.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 43	(1988; R 1995) Sizes of Aggregate for Road and Bridge Construction

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 422	(1963; R 1998) Particle-Size Analysis of Soils
ASTM D 698	(1998) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu.m.))
ASTM D 1140	(1997) Amount of Material in Soils Finer than the No. 200 (75-micrometer) Sieve
ASTM D 1556	(1990; R 1996) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 2167	(1994) Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D 2216	(1998) Laboratory Determination of Water

	(Moisture) Content of Soil and Rock by Mass
ASTM D 2487	(1998) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2922	(1996) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 2937	(1994) Density of Soil in Place by the Drive-Cylinder Method
ASTM D 3017	(1996) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 4253	(1993; R 1996) Maximum Index Density and Unit Weight of Soils Using a Vibratory Table
ASTM D 4254	(1991; R 1996) Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density
ASTM D 4318	(1998) Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D 4643	(1993) Determination of Water (Moisture) Content of Soil by the Microwave Oven Method
ASTM D 5195	(1991; R 1996) Density of Soil and Rock In-Place Below the Surface by Nuclear Methods

ENGINEERING MANUALS (EM)

EM 385-1-1	(1996) U.S. Army Corps of Engineers Safety and Health Requirements Manual

1.3 DEFINITIONS

1.3.1 Satisfactory Materials

Satisfactory materials shall consist of materials classified in accordance with ASTM D 2487 as CL, CH, ML, SC, SM, SP, SW, GW, GP, GM, GC and free from: roots and other organic matter; contamination from hazardous, toxic or radiological substances; trash, debris; and frozen materials. Not all satisfactory materials can be used in the levee and railroad embankment. Only the satisfactory materials stated above, meeting the additional or modified requirements of paragraph TYPES OF FILL MATERIALS, can be used for levee and railroad embankment construction.

1.3.2 Unsatisfactory Materials

Unsatisfactory materials shall not be used in any levee or railroad embankment or other required fill, unless otherwise noted in the these specifications and the contract drawings. Unsatisfactory materials includes all other materials that are not defined above as satisfactory materials.

1.3.3 Unstable Material

Unstable material shall consist of materials too wet to properly support the pipe, appurtenant structure, or embankment to be placed.

1.3.4 Unyielding Material

Unyielding material shall consist of rock and gravelly soils with stones greater than 3 inches in any dimension or as defined by the pipe manufacturer, whichever is smaller.

1.3.5 Embankment

The term "embankment" as used in these specifications is defined as the earth and rock fill portions of the levee, railroad, and access road or other fills related to the levee, railroad, and access road, and includes all types of earth fill for the project and all other fills within the limits of the project.

1.3.6 Excavation

Excavation shall consist of removal of material to the lines and grades shown on the drawings, or as otherwise directed or approved by the Contracting Officer and as described in paragraph EXCAVATION in PART 3 EXECUTION.

1.3.7 Classification of Soils

Materials used to construct the embankments and for backfills shall be classified in accordance with ASTM D 2487 (Unified Soil Classification System).

1.3.7.1 Cohesionless and Cohesive Materials

Cohesionless materials shall include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesionless only when the fines are nonplastic (when the plasticity index is equal to zero).

1.3.8 Degree of Compaction

1.3.8.1 Cohesive Material

Degree of compaction shall be expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 698, abbreviated hereinafter as percent laboratory maximum density.

1.3.8.2 Cohesionless Material

Degree of compaction shall be expressed as a percentage of the relative density in accordance with ASTM D 4253 and ASTM D 4254.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation;

submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330, SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Contractor's proposed excavation plan for structures, including dewatering, shoring, sheeting and bracing; G-RE,
Copy KCD-GL, HWS, KM, UPRR, KCD-DS

Submit a detailed excavation plan 30 days prior to the beginning of excavation. Submit a detailed shoring, sheeting and bracing plan 30 days prior to the beginning of any excavation so supported. The plan for shoring, sheeting and bracing shall be prepared and certified by licensed professional engineer. The plan shall include drawings and design computations of the proposed shoring, sheeting, and bracing, and documentation, showing details of the coordination and approval of shoring, sheeting, and bracing by the applicable parties. Approval of the detailed plan shall be obtained from the Contracting Officer prior to starting the work. If necessary, the plan shall be modified as required to meet field conditions, and the modifications shall be approved prior to use.

SD-02 Shop Drawings

Contractor-Furnished Rights-of-way for Drainage; G-RE,
Copy KDOT, KCD-GL

If private property is to be used for drainage, submit written evidence that the right has been obtained from the property owner for drainage on his property. Written evidence shall consist of an authenticated copy of the easement under which the Contractor acquired the property rights and access thereto, prepared and executed in accordance with applicable State and local requirements.

,

SD-03 Product Data

Excavation; G-RE
Copy UPRR, KM, HWS, KCD-GL

Submit a written excavation plan 30 days prior to the beginning of any excavation. Approval of the detailed plan shall be obtained from the Contracting Officer prior to starting the work. If necessary, the plan shall be modified as required to meet field conditions, and the modifications shall be approved prior to use. As a minimum, the plan shall contain, the following:

a. Proposed methods for preventing interference with, or damage to, existing underground or overhead utility lines, trees designated to remain and other man-made facilities or natural features designated to remain within or adjacent to the construction rights-of-way.

b. Provision for coordinating the work with other Contractors working in the construction rights-of-way or on facilities crossing or adjacent to this work.

c. The proposed methods for controlling surface and ground water in the borrow areas and required excavations.

d. Stockpiling plan for embankment material before it is transported to the project site showing locations, stockpile heights, slopes, limits, and drainage around the stockpile areas.

e. A complete listing of equipment used for excavation and to transport the excavated material. Manufacturers data and information on rollers/compactors to be used.

f. The Contractor's proposed sequence of work for excavating the borrow areas with plan and cross sectional views showing starting and final work locations and clearing, grubbing and stripping limits.

h. The Contractor's proposed road pattern, and plan for implementing dust control measures.

i. Inspection trench excavation plan detailing equipment and procedures proposed for the trench excavation.

j. Working Platform construction plan to include materials equipment, and procedures proposed for working platform.

Borrow Areas; G-RE,
Copy KCD-GL, HWS, UPRR, KDOT

Submit a written statement to the Government not later than 30 days after receipt of Notice to Proceed indicating the Contractor's intention to use the specified Government-furnished borrow area(s), Contractor-furnished borrow area(s), or a combination of these borrow areas.

SD-03 Product Data

Plan of Operations; G-RE,
Copy KDOT, UPRR, KM, HWS, KCD-GL

Thirty (30) days prior to commencement of haul road construction or placing embankment and backfill which ever is earlier, the contractor shall submit for approval a Plan of Operations for accomplishing all embankment and backfill construction and for the location and construction of haul roads. This plan shall include but not be limited to the Contractor's proposed sequence of construction for embankment and backfill items, and methods and types of equipment to be utilized for all embankment and backfill operations, including transporting, placing, and compaction. This plan should include a plan for measuring foundation settlement outside required measurement areas if the contractor chooses to measure settlement in these areas. This plan shall also include the names and addresses of the commercial testing labs which will perform the soil testing and inspection and describe how all required soils testing will be performed.

Testing Laboratory; G-RE,
Copy KCD-GL, HWS, UPRR

Approval of testing facilities shall be based on compliance with ASTM E548, and no work requiring testing will be permitted until the facilities have been inspected and approved by the COR.

Embankment and Backfill Materials; G-RE,
Copy UPRR, HWS, KCD-GL, KM.

At least 30 days prior to delivery of any Contractor-furnished material to the site of the work, the Contractor shall submit soil classification test results, moisture-density curves, gradation curves, and laboratory results of the required tests of the proposed material.

Select Granular Material for Structures; G-RE,
Copy UPRR, HWS, KCD-GL, KM.

At least 30 days prior to delivery of any Contractor-furnished material to the site of the work, the Contractor shall submit soil classification test results and a gradation curve for each of the proposed select granular materials to be used.

Work Platform/Stabilization Material; G-RE,
Copy UPRR, HWS, KCD-GL.

At least 30 days prior to delivery of any Contractor-furnished material to the site of the work, the Contractor shall submit soil classification test results and a gradation curve for the proposed work platform/stabilization materials to be used.

SD-03 Product Data

Nuclear Density; G-RE,
Copy UPRR, HWS, KCD-GL

Nuclear density testing equipment shall be used in accordance with ASTM D 2922 and ASTM D 3017. In addition, the following condition shall apply:

a. Prior to using the nuclear density testing equipment on the site, the Contractor shall submit to the Contracting Officer a certification that the operator has completed a training course approved by the nuclear density testing equipment manufacturer, the most recent data sheet from the manufacturer's calibration, and a copy of the most recent statistical check of the standard count precision.

b. The nuclear density testing equipment shall be capable of extending a probe a minimum of 12 inches down into a hole.

SD-03 Product Data

Blasting Plan of Operations; G-RE,
Copy UPRR, HWS, KCD-GL

At least 30 days prior to blasting the contractor shall submit a blasting plan.

SD-06 Test Reports

Measurement of Fill Material; G-RE,
Copy UPRR, HWS, KCD-GL

Submit a copy of the records of each compliance survey the next work day following the survey.

Test Results; G-RE.,
Copy KCD-GL, UPRR, HWS

Test results shall be furnished the COR within 24 hours of making the test.

SD-07 Certificates

Inspection and Test Results; G-RE,
Copy KCD-GL, HWS, UPRR

Inspections and test results shall be certified by a registered Professional Civil Engineer. These certifications shall state that the tests and observations were performed by or under the direct supervision of the Engineer and that the results are representative of the materials or conditions being certified by the tests.

1.5 GENERAL CONDITIONS

1.5.1 Lines and Grades

The embankment and backfill shall be constructed to the lines, grades, and cross sections indicated on the drawings, unless otherwise directed by the Contracting Officer. The Government reserves the right to increase or decrease the foundation widths and embankment slopes or to make such other changes in the embankment or backfill sections as may be deemed necessary to produce a safe structure.

1.5.2 Conduct of the Work

The Contractor shall maintain and protect the embankment and backfill in a satisfactory condition at all times until final completion and acceptance of all work under the Contract. If, in the opinion of the Contracting Officer, the hauling equipment causes horizontal shear planes or slicken sides, rutting, quaking, heaving, cracking, or excessive deformation of the embankment or backfill, the Contractor shall limit the type, load, or travel speed of the hauling equipment on the embankment or backfill. The Contractor may be required to remove, at his own expense, any embankment material placed outside of prescribed slope lines. Any approved embankment or backfill material which is lost in transit or rendered unsuitable after being placed in the embankment or backfill and before final acceptance of the work shall be replaced by the Contractor in a satisfactory manner and no additional payment will be made therefore. The Contractor shall excavate and remove from the embankment or backfill any material which is unsatisfactory and shall also dispose of such material and refill the excavated area as directed, all at no cost to the Government.

1.5.3 Materials

Materials for embankment and backfill construction will be obtained from required excavation, required borrow areas, and other available onsite borrow areas as shown in the contract documents. The Contractor may obtain material from offsite borrow areas that have been approved by the Contracting Officer. Materials obtained from required excavation which meet or which can be processed to meet the requirements for each embankment material, or any other material required for this project, as specified herein, may be utilized in the appropriate zone of the embankment or as backfill. All roots, limbs, and wood fragments shall be removed from embankment materials. Materials containing sod, other organic or perishable material, trash, debris, and frozen materials shall not be used in the embankment except in areas designated for disposal. The Contractor shall submit to the Contracting Officer the source or sources from which he intends to obtain materials for embankment construction. If a source is selected other than a commercial quarry or other commercial entity from which earth or rock material will be directly purchased and where the Contractor or his subcontractor will perform the borrow excavation, a written statement will be provided to the Contracting Officer indicating permission to utilize the area. It shall be the responsibility of the Contractor to obtain Federal, State, and local permits which may be required for excavation and reclamation of the borrow area. A copy of the plan and procedures to be utilized for reclamation shall be furnished to the Contracting Officer as required in these specifications. The Contracting Officer will require material samples from any proposed borrow source to be submitted as indicated in paragraph FIELD QUALITY CONTROL.

The Contractor shall coordinate with the Kansas Department of Transportation (KDOT) regarding the intersections of the haul roads and KDOT's roadways. KDOT will thicken the roadway surface at the proposed intersection(s) to prevent damage to the roadway from the Contractor's operation. The Contractor should assume no flagging or other traffic control will be required at the intersection of haul roads and KDOT's roadways.

1.5.4 Haul Roads

Haul roads shall be located and constructed as approved by the Contracting Officer. Prior to the commencement of construction the contractor shall submit for approval a site plan detailing the location of all haul roads within the project limits. Areas on each side of the borrow haul road corridor in the vicinity of the US 36 bridge, US 77 bridge, and UPRR rail yard shall not be disturbed. The Contractor shall coordinate with other contractors performing work and the UPRR to minimize interference with operations of others. Haul roads which cross railroad tracks must be approved in advance by the Union Pacific Railroad company. Non-public, railroad grade crossings may not be used by construction equipment unless a railroad flagman is present, as outlined in Section 01100. Haul roads shall be constructed to maintain the intended traffic, be free draining, and be maintained in good condition throughout the contract period. Any haul road which crosses any creek or drainage channel shall be constructed, and maintained by the Contractor so as to not flood either upstream areas by restricting stream flows or flood downstream areas by the release of any stored water in the event that the crossing fails for any cause. Haul roads constructed during the contract duration shall be removed after work is completed and the impacted area restored to its preconstruction conditions. The Contractor shall plow and/or scarify or otherwise loosen all access and haul roads other than existing roads to a minimum of 6 inches deep and the surface shall be left in a smooth condition. All haul roads within the right-of-way that will remain as public thoroughfares after

construction shall be cleaned daily and maintained in the preconstruction condition. All costs associated with these haul roads shall be considered as a subsidiary obligation of the Contractor.

1.5.5 Ramps and Crossings

Ramps and crossings shall be constructed at the locations shown on the drawings by placement of impervious fill. Ramps and crossings shall be constructed only by adding material to the levee crown and slopes. Landside ramps shall have a 15 foot crown width (except landside ramp at North Tieback STA 3+38 is a 10 foot crown), a grade as shown in the contract drawings, and 1V on 3H side slopes. Riverside ramps shall have a 10 foot crown width, a grade as shown in the contract drawings, and 1V on 3H side slopes unless otherwise shown in the contract drawings.

1.5.6 Runways

Where material is hauled over an existing levee for construction, the Contractor at his expense will be permitted to construct temporary runways over the levee by the addition of material to the levee cross section. The Contractor shall stockpile, as directed by the Contracting Officer, sufficient suitable levee embankment material to construct emergency closure of the cuts.

1.5.7 Stockpiling

Any on-site stockpiling of embankment materials shall be in accordance with paragraph titled STOCKPILES. No payment will be made for such stockpiling nor for the reloading and hauling of these materials to their final position.

1.5.8 Slides and Foundation Failures

When sliding occurs in any part of the embankment and backfills prescribed in this section after they have been placed, but prior to final acceptance of all work under the contract, the Contractor shall repair the slide as directed by the Contracting Officer. When the slide is caused through the fault of the Contractor, the repair shall be made at no cost to the Government. When the slide is not the fault of the Contractor, an equitable adjustment in the contract price shall be made pursuant to the Contract Clause CHANGES to cover the cost of the repairs.

1.5.9 Drainage

The Contractor shall not block or restrict the flow in a natural drain, existing culvert, ditch or channel at any time without obtaining prior written approval from the Contracting Officer. This approval shall not relieve the Contractor from responsibility for any damage caused by his operation. The Contractor shall monitor the flows and provide sufficient free discharge areas so that conditions are not worsened upstream or downstream by possible floods during construction. Surface water shall be directed away from excavations and construction sites so as to prevent erosion and undermining of foundations. Diversion ditches, dikes, and grading shall be provided and maintained as necessary during construction. Excavated slopes and backfill surfaces shall be protected to prevent erosion and sloughing. Excavation shall be performed so that the site and the area immediately surrounding the site and affecting operations at the site shall be continually and effectively drained.

Surface water and groundwater shall be removed or controlled as required to allow placement and compaction of fill in the dry. Dewatering and groundwater control shall be accomplished in coordination with the required excavation and embankment construction. Where the presence of groundwater or ponded water would require dewatering prior to fill placement, the Contractor may at his option construct a working platform in lieu of dewatering. Working platform construction shall be in accordance with paragraph Working Platform.

1.6 PERMITS

In accordance with Contract Clause PERMITS AND RESPONSIBILITIES, the Contractor shall obtain all necessary permits required for disposal, hauling, erosion control, burning, and pay all fees associated with permitting and compliance.

1.7 PROJECT SITE CONDITIONS

1.7.1 Protection of Cultural and Natural Resources

All work and Contractor operations shall comply with the requirements of Section 01355 ENVIRONMENTAL PROTECTION and with the requirements of this section.

1.7.2 Protection of Existing Man-Made Facilities and Natural Features

Excavation shall be conducted in such a manner as to avoid damage to trees left standing and trees outside the clearing and excavation area, existing buildings, man-made facilities and natural features, with due regard to the safety of employees and others, and in compliance with EM 385-1-1. Existing utility lines that are shown on the drawings or the locations of which are made known to the Contractor prior to excavation and that are to be retained shall be protected from damage during excavation. When utility lines that are to be removed are encountered within the area of operations, the Contractor shall notify the applicable utility companies in sufficient time for measures to be taken to prevent interruption of the services.

1.7.3 Subsurface Data

Subsurface soil boring logs are shown on the drawings. This data represents subsurface information at the boring locations; however, variations may exist in the subsurface between boring locations. Groundwater levels indicated on the soil boring logs were levels found at the time of exploration. The groundwater table can vary significantly depending on time of year, variation from normal precipitation, and river stage.

PART 2 PRODUCTS

2.1 TYPES OF FILL MATERIALS

2.1.1 Impervious Fill

This material shall consist of satisfactory cohesive material classified as lean clay (CL), fat clay (CH), low plasticity silt (ML), and borderline clay and silt (CL-ML) in accordance with ASTM D 2487.

2.1.2 Random Fill

Random fill may consist of satisfactory cohesive materials, satisfactory cohesionless materials, or any combination of them.

2.1.3 Railroad Fill

Railroad fill may consist of satisfactory cohesive materials , satisfactory cohesionless materials, or any combination of them. Railroad fill in the upper 36 inches of all embankment side slopes and the upper 36 inches of subgrade shall consist of satisfactory materials classified as ML or CL in accordance with ASTM D 2487, and shall have a maximum plasticity index of 30 in accordance with ASTM D 4318. Topsoil shall be placed over the 24 inches of satisfactory CL or ML material where surfacing is not required.

2.1.4 Topsoil

In general, topsoil material shall be material organic in nature and capable of sustaining the specified vegetative growth. Topsoil material shall be the material stripped in preparation of the fill, excavation, or general construction. Stripped material is addressed within Section 02230, CLEARING, GRUBBING, AND STRIPPING. Topsoil from offsite sources, proposed by the Contractor and approved by the COR, shall be supplemented as necessary when there is insufficient acceptable on-site sources. Topsoil material shall be free from clay lumps, weeds, litter, brush, matted roots, toxic substances, or any material harmful to plant growth or which would hinder grading, planting, operation, or maintenance operations. Topsoil material shall not contain more than 5 percent by volume of stones or other such objects larger than 1 inch in any dimension. Topsoil material shall be such that a minimum of 50 percent of the soil particles pass a U.S. Standard No. 200 sieve.

2.1.5 Work Platform/Stabilization Material

Work platform/stabilization material shall consist of crushed granular material obtained from a source provided by the Contractor. Work platform/stabilization material shall be free of silt, clay, or other earth materials in quantities greater than 5 percent by weight, and shall contain no debris or organic material. Work platform/stabilization material shall be reasonably well graded and the largest stones shall have a maximum dimension not exceeding 18-inches. Work platform/stabilization material placed within 3-feet of any structure shall have a maximum size of 2-inches.A separation/filtration fabric as specified in Section 02373 shall be used to encapsulate any work platform/stabilization material having a D15 particle size greater than 0.5mm. The D15 is defined as the particle size for which 15% by weight of particles are smaller.

2.1.6 Select Granular Material

Select granular material shall consist of crushed gravel or crushed stone composed of hard, tough and durable particles, and shall contain not more than 10 percent by weight of material passing a No. 200 mesh sieve, no more than 50 percent by weight of material passing a the No. 4 mesh sieve, and no less than 95 percent by weight passing the 1 inch sieve. The maximum allowable aggregate size shall be 1-1/2 inches, or the maximum size recommended by the pipe manufacturer, whichever is smaller.

2.1.7 Drainage Fill Material

Drainage fill material shall consist of sand classified in ASTM D 2487 as

SP or SW as determined by ASTM D 422. Drainage fill material shall contain not more than 4 percent by weight passing a No. 200 mesh sieve and not less than 95 percent by weight the U.S. No. 4 sieve.

2.2 SETTLEMENT GAGES

Settlement gages shall be constructed as shown in the contract drawings. The contractor shall maintain a supply of instrument pipe and protective casing risers required to raise the instruments through the embankment on the project site. These parts shall be protected from damage and shall be maintained in a clean functional condition until installation by the Contractor.

PART 3 EXECUTION

3.1 SHORING, SHEETING, AND BRACING

Shoring, sheeting, and bracing shall be installed where required for the protection of existing natural features and man-made facilities, for the safety of workers and the public, in compliance with EM 385-1-1, and to insure the integrity of the embankment. Shoring, sheeting and bracing shall not be used in lieu of the required excavation slopes. Shoring, sheeting, and bracing shall be adequately designed and properly installed to withstand anticipated loads. Shoring, sheeting and bracing shall be planned and designed by a registered professional engineer. The Contractor shall submit a plan for shoring, sheeting, and bracing in accordance with paragraph SUBMITTALS. All shoring, sheeting and bracing shall be removed as embankment and backfill operations progress.

3.2 DEWATERING AND DIVERSION

Surface and groundwater control shall be accomplished in coordination with the required excavation and embankment construction. Surface and/or groundwater control may necessitate the use of temporary diversion ditches, coffer dams and/or dewatering by the use of pumping. Methods for care of surface water and for controlling the surface and groundwater levels shall be subject to approval of the Contracting Officer.

3.3 EXCAVATION

Excavation shall consist of removal of material in preparing the foundations to the lines and grades shown on the drawings, removal of material from ditches and channels to the lines and grades shown on the drawings, removal of objectionable materials and obtaining required fill materials from the borrow areas. The contractor shall verify the location of all existing utilities prior to any excavation. Kansas One Call (1-800-344-7233)shall be contacted for a utility locate. Blasting will be permitted. Over excavation shall be backfilled to grade with similar over excavated material or satisfactory material and compacted to a density of at least that of the surrounding material. Excavation will not be paid for as a separate bid item, but shall be subsidiary to placement of fill or structure construction.

3.3.1 Over Excavation

3.3.1.1 Outside Limits of Levee Foundations or Structures

Over excavation outside the limits of the foundations of levees or

structures shall be backfilled to grade with similar over excavated material or satisfactory material and compacted to a density of at least that of the surrounding material.

3.3.1.2 Within Limits of Levee, Railroad Foundations, or Structures

Over excavation within the limits of the foundations of the levee and railroad shall be backfilled to grade in accordance with paragraph PREPARATION OF FOUNDATION AND PARTIAL FILL SURFACES. Over excavation within the limits of structures shall be backfilled in accordance with paragraph PREPARATION OF FOUNDATION AND PARTIAL FILL SURFACES except as shown on the contract drawings.

3.3.2 Inspection Trench

An inspection trench shall be excavated and maintained free of standing water to a depth of 5 feet with a minimum width of 12". The inspection trench shall be excavated throughout the length of the levee, including the North and South tie-back levees. The inspection trench shall be excavated 5' riverward of the edge of construction (i.e. riverward toe of levee, riverward toe of East River Road, or riverward edge of fill area as shown on the contract drawings). The Contractor shall inspect all spoils from trenching for materials such as PVC and clay pipe in an effort to identify the existence of field drain tiles and other utility pipes. The Contractor shall immediately notify the Contracting Officer if and when a field tile or utility is encountered. Once the inspection trench has been inspected by the Contractor and the Contracting Officer, it shall be backfilled with impervious fill in accordance with the requirements herein. Material excavated that is not classified as cohesive may be utilized elsewhere in construction within the appropriate zone. Excavated materials and items that are unacceptable for re-use on this project shall be the responsibility of the Contractor and removed from the site. The trench shall be excavated at least 300 feet in advance of construction.

3.3.3 Structures

Excavations for structures shall conform to the dimensions and elevations indicated for each structure and footing, except as specified hereinafter. Excavation shall extend a sufficient distance from walls and footings to allow for placing and removal of forms for the full length and width of structure footings and foundations as shown. Rock shall be cleaned of loose debris and cut to a firm surface either level, stepped, or serrated, as shown or as directed. Loose disintegrated rock and thin strata shall be removed. Removal of unstable material shall be as specified below. When concrete or masonry is to be placed in an excavated area, special care shall be taken not to disturb the bottom of the excavation. Excavation to the final grade level shall not be made until just before the concrete or masonry is to be placed. During excavation, material satisfactory for backfilling shall be stockpiled in an orderly manner at a distance from the banks of the trench equal to 1/2 the depth of the excavation, but in no instance closer than 2 feet. Excavated material not required or not satisfactory for backfill shall be removed from the site. Grading shall be done as may be necessary to prevent surface water from flowing into the excavation, and any water accumulating shall be removed to maintain the stability of the bottom and sides of the excavation. Unauthorized overexcavation shall be backfilled in accordance with paragraph Placement of Embankment and Backfill Against Structures at no additional cost to the Government. Excessively wet and/or soft material in subgrades resulting from water ponding in footing excavations shall be removed and replaced

with satisfactory material compacted to the density of the surrounding undisturbed material.

3.3.3.1 Trench Excavation Requirements

The trench shall be excavated as recommended by the manufacturer of the pipe to be installed and conform to all Corps of Engineers and OSHA requirements. Special attention shall be given to slopes which may be adversely affected by weather or moisture content.

3.3.3.2 Bottom Preparation

The bottoms of trenches shall be accurately graded to provide uniform bearing and support for the bottom quadrant of each section of the pipe. Bell holes shall be excavated to the necessary size at each joint or coupling to eliminate point bearing. Stones of 2 inches or greater in any dimension, or as recommended by the pipe manufacturer, whichever is smaller, shall be removed to avoid point bearing.

3.3.3.3 Removal of Unyielding Material

Where unyielding material is encountered in the bottom of the trench, such material shall be removed to a minimum of 4 inches below the required grade and replaced with suitable materials as provided in paragraph Placement of Embankment and Backfill Against Structures.

3.3.3.4 Removal of Unstable Material

Where unstable material is encountered in the bottom of the trench, such material shall be removed to the depth directed and replaced to the proper grade with select material as provided in paragraph Placement of Embankment and Backfill Against Structures. When removal of unstable material is required due to the Contractor's fault or negligence in performing the work, the resulting material shall be excavated and replaced by the Contractor without additional cost to the Government.

3.3.3.5 Excavation for Appurtenances

Excavation for catch-basins, inlets, or similar structures shall be of sufficient size to permit the placement and removal of forms for the full length and width of structure footings and foundations as shown. Rock shall be cleaned of loose debris and cut to a firm surface either level, stepped, or serrated, as shown or as directed. Loose disintegrated rock and thin strata shall be removed. Removal of unstable material shall be as specified above. When concrete or masonry is to be placed in an excavated area, special care shall be taken not to disturb the bottom of the excavation. Excavation to the final grade level shall not be made until just before the concrete or masonry is to be placed.

3.3.3.6 Stockpiles

Stockpiles of satisfactory materials shall be placed and graded as specified. Stockpiles shall be kept in a neat and well drained condition, giving due consideration to drainage at all times. Stockpiles of satisfactory materials shall be protected from contamination which may destroy the quality and fitness of the stockpiled material. If the Contractor fails to protect the stockpiles, and any material becomes unsatisfactory, such material shall be removed and replaced with satisfactory material from approved sources at no additional cost to the

Government.

3.3.4 Channels

Channels shall be excavated at the locations and to the lines and grades shown on the drawings and in accordance with paragraph TOLERANCES.

3.3.5 Ditches

Drainage ditches shall be excavated at the locations and to the lines and grades shown on the drawings and in accordance with paragraph TOLERANCES.

3.3.6 Slopes and Surcharges

Temporary excavation slopes for any channel, structure excavation, or other required excavation shall not be steeper than the specified finished slope or the specified construction slope, as applicable, and subject to the approval of the Contracting Officer. This may be accomplished by benching the temporary slope so that the average slope is not steeper than the specified slope. In addition, no temporary, permanent, or construction slope shall be surcharged with excavated or stockpiled material or with heavy construction equipment which would have the same effect as the surcharge material. The toe of stockpiled material shall be maintained a minimum distance back from the top of the finished excavation equal to the depth of the excavation. The maximum height of such stockpile without causing instability of the excavation slope shall be determined by the Contractor. Any slide or other adverse conditions caused by failure of the Contractor to maintain these conditions shall be considered the responsibility of the Contractor and remedial measures shall be at the Contractor's expense.

3.3.7 Borrow Areas

3.3.7.1 Government-Furnished

The required borrow ares and other available borrow areas are shown on the contract drawings. The required borrow areas shall be excavated to the limits shown. The other available borrow areas shall be excavated to the extent necessary to obtain satisfactory material within the lines and grades as shown on the drawings. **TEXT DELETED**

Borrow excavation located within 500 feet landward and 300 feet riverward of the centerline of the levee will not be permitted except where stated on the contract drawings. Borrow excavation located within 250 feet of the high bank of the Big Blue River and Spring Creek will not be permitted. Borrow excavation located within 50 feet of underground utilities will not be permitted. Slopes on borrow areas shall be no steeper than 1(V) on 3(H). Any excavation below the depths and slopes specified herein or shown on the drawings shall be backfilled by the Contractor, at the Contractor's expense, to the specified permissible excavation line, with satisfactory cohesive material as specified by the Contracting Officer to a density of at least that of the surrounding material. Borrow areas shall be drained and kept dry during excavation. Unsatisfactory materials in borrow areas shall be removed.

3.3.7.2 Contractor-Furnished

Borrow areas proposed by the Contractor shall be subject to approval by the Contracting Officer. Any borrow sources proposed, accepted and approved by

the Contracting Officer shall meet all applicable Federal, State and local requirements. Proposed sources located within 500 feet landward and 300 feet riverward of the centerline of the levee will not be permitted.

3.3.8 Existing Levees and Spoil Banks

Existing levees and spoil banks shall be removed as shown on the drawings. In areas where the existing levee is located within the random fill zone of the levee or railroad fill zone, it shall be incorporated into the embankment. Portions of existing embankments which lie within the impervious fill zone of the levee shall be removed down to existing cohesive material. When lower levels of flood protection would be caused by levee construction the contractor shall provide the Contracting Officer a plan to maintain existing levels of protection during the construction period. Where existing pipes are to be removed from the existing embankment, the Contractor shall return the levee, at minimum, to its pre-existing elevation and geometry within 24 hours of beginning excavation. Compacted impervious fill shall be used to backfill cuts in the existing levee.

3.3.9 Rock

Rock and other hard foundation materials shall be cleaned of loose debris and cut to a firm surface, either level, stepped, or serrated, as shown on the drawings. Loose disintegrated rock and thin strata shall be removed. Rock excavation will not be measured for payment. Rock excavation will not be paid for as a separate bid item.

3.3.10 Blasting

3.3.10.1 Use of Blasting

Blasting shall be used in cut sections only as necessary to loosen rock or cemented material and to reduce such rock or cemented material to sizes that can be handled by mechanical earth moving equipment.

3.3.10.2 Ripping

Ripping shall be the preferred method of removing rock and cemented material from cut sections and ripping shall be used whenever possible to remove rock and cemented materials from cut sections.

3.3.10.3 Excessive Blasting

Excessive blasting will not be permitted. The Contractor shall stop any method of blasting which leads to overshooting or which is dangerous to public or destructive to property or natural features. Blasting shall not be used as a method of moving rock, cemented material or earth cut in a cut section.

3.3.10.4 Railroad Protection

The Contractor shall use extreme caution to protect the tracks, ballast, subgrade and other railroad facilities from blasting operations. The Contractor must have the approval of the Railroad and the flagman prior to any blasting. The Contractor may use protective barriers or blankets for protection of the track, ballast, subgrade and other facilities if approved in advance by the Railroad. The Contractor shall immediately clear any debris, protective barriers or blankets within twenty-five (25) feet of the

tracks after blasting. Any damage to the tracks , ballast structure, subgrade or other facilities shall immediately be brought to the attention of the Railroad.

3.3.11 Blasting Procedures

Rock or other material outside the cut section will not be disturbed. The shape of the cut section after blasting has been completed will conform as nearly as possible to the lines and grades for the cut section shown on the Drawings or established by the Contracting Officer.

3.3.12 Removal of Overburden Prior to Blasting

Prior to blasting, the Contractor shall, in accordance with the excavation procedures set forth in these specifications, remove from the cut section as much overburden as possible using heavy earth moving equipment. The Contractor shall stabilize slopes which require stabilization before proceeding with the blasting.

3.3.13 Preparation to Blast

3.3.13.1 Relief Holes

Relief holes shall be drilled in all types of rock where the slope line of the cut section is one to one or steeper and where the depth of rock is ten feet or more.

Relief holes shall consist of holes two inches or larger in diameter and shall be drilled along the theoretical slope line of the cut section.

Spacing of relief holes shall be twenty-four inches on centers.

The collars of each series of relief holes shall be aligned in a reasonably straight line.

3.3.13.2 Pre-Splitting

Presplitting shall be used to cause a continuous or semi-continuous fracture between relief holes.

Presplitting shall be accomplished by loading the relief holes with string charges consisting of 40% gelatin dynamite attached to detonating cord so that all charges in a relief hole and all relief holes in a designated section will be exploded all at once.

Prior to loading primary blast holes, charges shall be uniformly spaced throughout the length of the relief hole with charges attached to the detonating cord using an evenly distributed charge of one-quarter pound of dynamite per linear foot of depth. In addition, one pound of dynamite shall be concentrated at the bottom of the relief hole.

Relief holes shall be stemmed with course dry sand or dry, free-running gravelly sand having a maximum size of three-eighths of an inch. Below ground water level, water stemming may be used.

3.3.13.3 Trim Shooting

Minor amounts of rock projecting into the cut section may be removed by

trim shooting with the prior consent of the Engineer.

Trim shooting is a blasting procedure which does not require presplitting and where the relief holes are charged as part of the total explosive charge or as the complete charge.

No relief or blast holes utilized in trim shooting shall be located outside of the cut section. The Contractor shall take care not to disturb material adjacent to the area being trim shot.

The same quantity, type and distribution of explosives used in presplitting shall be used in trim shooting.

3.3.14 Limitations

The following limitations are mandatory for all blasting operations except in quarries.

3.3.14.1 Benches

When drilling and blasting rock cut sections, benches shall be created at intervals not to exceed twenty feet in height. This limitation does not apply to relief holes.

3.3.14.2 Use of Coyote Tunnels and Spring Holes

The use of coyote tunnels and spring holes is prohibited for concentration of charges.

3.3.14.3 Quantity of Explosives

Explosives shall be of such quantity and shall be used in such a manner as will neither open seams nor otherwise damage rock outside the cut section.

3.3.14.4 Repair Damage

Should seams be opened or rock outside the cut section be otherwise damaged, the Contractor shall perform all work, in the opinion of the Contracting Officer, as necessary to remedy such damage.

3.3.14.5 Time of Placement and Detonation

Placement and detonation of explosives shall, to the extent reasonably possible, take place during the same work shift. Explosives shall never be placed one day and left overnight for detonation on a subsequent day.

3.3.14.6 System of Blasts

The firing of systems of blasts shall be controlled by using delay detonators. Both the period of each delay and the amount of explosive used for any single period of delay shall be the minimum required to fracture the rock properly.

3.3.14.7 Depth of Blast Holes

Blast holes shall never be drilled to a depth which would cause the blast holes to intersect the theoretical slope line of the cut section. Final lift blast holes shall be drilled and loaded to a depth of at least one foot but not greater than two feet below the subgrade elevation as shown on

the drawings.

3.3.14.8 Blasting Along Rock Cliffs

In blasting along rock cliffs where preservation of bed rock at and below the subgrade is necessary to provide support for the full width of the Subgrade, the Contractor shall reduce depths of all drill holes, reduce quantities of explosives, modify drill patterns and take other measures necessary to prevent breaking down, loosening, or otherwise damaging the supporting bed rock below the subgrade.

3.3.15 Blasting Plan

Prior to each blast, the Contractor shall furnish the Contracting Officer with a plan showing the following:

The pattern and depth of all blast holes including relief holes.

The type of explosive used.

The loading pattern.

The sequence of the firing.

3.3.16 Information Related on the Plans

The plan shall show the position of all holes.

The plan shall show charges relative to the position of all holes.

The plan shall show charges relating to engineering stations.

The plan shall show grades, lines, and slopes of the cut section or as designated by the Contracting Officer.

The blasting plan is for record purposes only, and will not absolve the Contractor of his responsibility for using proper drilling and blasting procedures.

3.3.17 Riprap

Excavations for riprap shall be performed at the locations and to the lines and grades shown. Riprap placed in ditch and channel bottoms shall be placed so that the top of riprap will be level with the flowline as shown in the contract drawings.

3.4 TOLERANCES

3.4.1 Excavation

A tolerance of 2 inches above or below the prescribed grade will be allowed in the excavation for channels, ditches, inspection trenches, excavations for riprap, turf reinforcement mat and required borrow areas.

3.4.2 Embankments and Backfills

All embankments and backfills shall be constructed to the grades, lines, and cross-sections shown on the drawings. At all points a tolerance of 2 inches in (50) feet above or below the prescribed grade will be permitted

in the final dressing, provided that any excess material is so distributed that the crown of the levee drains and that there are no abrupt humps or depressions in any surfaces. Tolerances shall not be allowed in pipe bedding.

3.5 SLIDES

In case sliding occurs in any part of the excavations prescribed in this section after they have been excavated, but prior to final acceptance of all work under the contract, the Contractor shall repair the slide as directed by the Contracting Officer. In case the slide is caused through the fault of the Contractor, it shall be repaired at no cost to the Government. In case the slide is due to no fault of the Contractor, an equitable adjustment in the contract price will be made for the repairs in accordance with the Contract Clause CHANGES.

3.6 STOCKPILES

Provisions of paragraph SLOPES AND SURCHARGES are applicable to all stockpiled materials. Upon completion of construction operations, all remaining stockpiled material shall be removed and disposed of by the disposal methods specified in paragraph DISPOSITION OF EXCAVATED MATERIALS.

3.7 SURFACE DRAINAGE OF COMPLETED AREAS

The areas shown on the drawings designated as "GRADE TO DRAIN", the borrow areas, and the finished embankment areas shall be graded to the lines and grades shown on the drawings. The surface shall be free from sharp ridges, gullies, potholes, sinkholes, and any other surface irregularities. A tolerance of 2 inches above or below the prescribed grade will be allowed provided that the surface drains in the direction as indicated on the drawings.

3.8 MAINTENANCE OF WORK

3.8.1 Debris Removal

The Contractor shall maintain all ditch and channel excavations free from leaves, brush, sticks, trash, and other debris until final acceptance of all work under the contract at no additional cost to the Government.

3.8.2 Sediment Removal

Prior to final acceptance of all work under this contract, the removal of sediments from ditch or channel excavations shall be required to restore design grade and section at no additional cost to the Government.

3.9 DISPOSITION OF EXCAVATED MATERIALS

3.9.1 Satisfactory Materials

Satisfactory excavated material shall be incorporated in the appropriate zones of the embankment. Satisfactory material shall consist of material as defined in paragraph DEFINITIONS, subparagraph SATISFACTORY MATERIALS. When direct placement is not practicable, satisfactory material from the excavation may be stockpiled for subsequent use in parts of the work for which it is specified herein and/or as indicated on the drawings. Satisfactory materials in excess of the quantity necessary to construct

backfills and embankments shall be disposed of as specified for unsatisfactory materials.

3.9.2 Unsatisfactory Materials

Unsatisfactory materials shall be as defined in paragraph DEFINITIONS, subparagraph UNSATISFACTORY MATERIALS. Unsatisfactory materials from the excavations prescribed in this section shall be permanently disposed of by removal from the site to a Contractor-furnished disposal area or by placing in the disposal area as described in these specifications. No additional payment will be made for Contractor-furnished disposal areas.

3.10 PREPARATION OF FOUNDATION AND PARTIAL FILL SURFACES

3.10.1 Non-Railroad Fill Subgrade

After excavation or stripping of the embankment foundation to the extent indicated or otherwise required, the sides of stump holes, test pits, and other similar cavities or depressions shall be broken down so as to flatten out the slopes, and the sides of the cut or hole shall be scarified to provide bond between the foundation material and the fill. Unless otherwise shown on the contract drawings, each depression shall be filled with the same material type that is to be placed immediately above the foundation. The fill shall be placed in layers, moistened, and compacted in accordance with the applicable provisions of paragraphs PLACEMENT AND SPREADING, MOISTURE CONTROL, and COMPACTION for the specific material type. Materials which cannot be compacted by roller equipment because of inadequate clearances shall be compacted with power tampers in accordance with the paragraph COMPACTION for the specific material type. After filling of depressions and immediately prior to placement of compacted fill in any section of the embankment, the foundation of such section shall be loosened thoroughly by scarifying, plowing, discing or harrowing to a minimum depth of 6 inches, and the moisture content shall be adjusted to the amount specified in paragraph MOISTURE CONTROL for the appropriate type of material. The foundation shall be compacted using no less than 4 passes with equipment as described in paragraph COMPACTION.

Immediately prior to placement of compacted fill on or against the surfaces of any partial fill section, all soft or loose material, all material containing cracks or gullies, and all material that does not conform with the specified zoning of the embankment shall be removed. The remaining surface of the partial fill shall be loosened by scarifying, plowing, discing or harrowing to a minimum depth of 6 inches, and the moisture content shall be adjusted as specified in paragraph MOISTURE CONTROL for the appropriate type of material. The surface of the partial fill section upon which fill is to be placed shall then be compacted as hereinafter specified for the appropriate type of fill. No separate payment will be made for loosening and rolling the foundation area or the surfaces of partial fill sections, but the entire cost thereof shall be included in the applicable contract price for fill.

3.10.2 Railroad Fill Subgrade

After excavation or stripping of the embankment foundation to the extent indicated or otherwise required, the sides of stump holes, test pits, and other similar cavities or depressions shall be broken down so as to flatten out the slopes, and the sides of the cut or hole shall be scarified to provide bond between the foundation material and the fill. Unless otherwise directed by the COR, each depression shall be filled with the

same material type that is to be placed immediately above the foundation. The fill shall be placed in layers, moistened, and compacted in accordance with the applicable provisions of paragraphs PLACEMENT AND SPREADING, MOISTURE CONTROL, and COMPACTION for railroad fill. Materials which cannot be compacted by roller equipment because of inadequate clearances shall be compacted with power tampers in accordance with the paragraph COMPACTION for the specific material type.

3.10.2.1 Proofrolling

After stripping all vegetation from the embankment areas and prior to placement of Railroad Fill, the foundation shall be proofrolled. The contractor shall proof-roll all stripped areas by repeated rubber tired loading, using a loaded dump truck (18-20 Kip per Axle, 1 Kip=1000 lbs) or similar piece of equipment to locate unstable areas. The maximum spacing between longitudinal passes of proofrolling equipment shall be fifty (50) feet. The COR may direct proofrolling of other areas as needed to locate unstable areas. The COR will assess all areas during proof-rolling and identify the limits of unstable areas that require stabilization. The Contractor shall give the COR a minimum of 2 working days notice prior to proofrolling operations.

3.10.2.2 Stabilization of Subgrade and Preparation After Proofrolling

After visual inspection and approval from the COR, the existing subgrade in areas that appear to be generally stable beneath proofrolling shall be scarified to a minimum depth of six inches and reworked to a uniform condition conforming to paragraphs MOISTURE CONTROL and COMPACTION. In areas that the COR determines to be unstable, work platform/stabilization material and/or railroad fill shall be placed in areas and thicknesses as directed by the COR. Excavation for placement of work platform/stabilization material and/or railroad fill material shall be performed in areas and thicknesses as directed by the COR.

3.10.3 Benching

When fill is to be placed against an embankment such as the existing levee or placed fill, the Contractor shall bench into the embankment to facilitate fill placement. The vertical face of the bench shall be approximately the compacted lift thickness of the adjacent fill.

3.10.4 Overbuild and Surcharging

Overbuild and surcharging of the railroad foundation shall be constructed as shown on the contract drawings. The overbuild and surcharge shall be constructed to the cross section shown on the drawings for the applicable location. The overbuild zone will become part of the permanent embankment while the surcharge zone will not. At the interface of the overbuild and surcharge the contractor shall place plastic survey ribbon on a 5 foot grid so as to identify the overbuild surface upon surcharge removal.Random fill shall be used in the surcharge zone. After completion of the construction of the surcharge embankment, no additional construction shall take place in the surcharge areas for 450 days or as directed by the contracting officer, whichever is less. After 450 days or upon approval by the contracting officer the surcharge embankment may be removed to the final elevation shown in the contract drawings. Overbuild as shown for the levee shall remain in place and shall not be removed.

3.10.5 Settlement of Foundation

The Contractor shall furnish and install settlement gages, at the settlement measurement locations shown on the plans, for determination of settlement of the foundation during construction within the settlement measurement ranges shown on the drawings. Each settlement measurement location shall be located on the prepared foundation at the locations indicated on the contract drawings.

If any of the instrumentation becomes damaged or ineffective, whether arising from the contractor's execution or from the non-execution of the work, the contractor shall suspend embankment operations within 150 feet radius from the instrumentation location and immediately repair the instrumentation location and immediately repair the instrument to the satisfaction of the Contracting Officer, or furnish and install replacement instrumentation at a location designated by the Contracting Officer, at no cost to the government.

The contractor shall place and hand-tamp fill to a minimum 3 feet height and a minimum 8 foot diameter around all instruments after risers have been added and before successive lifts of fill are placed.

Immediately after the installation of each plate, the top elevation of each settlement plate shall be surveyed by the contractor to the nearest 0.01 feet. Plate extensions and riser pipe shall be installed as necessary by the contractor and surveyed by the contractor to the nearest 0.01 feet. The contractor shall survey before and after the addition of each individual riser extenstion to the nearest 0.01 feet. The contractor shall submit a record of the final as-built geometry of each plate which clearly indicates the final length of all extensions installed.

Elevations (recorded to the nearest 0.01 foot) at the top of each settlement pipe shall be determined by the contractor:

-Daily for a minimum of one (1) week after all fill and surcharge is in place.
-Every 2 to 3 days for the first four (4) weeks thereafter, and
-Once a week thereafter until it has been determined by the Contracting Officer that consolidation of the compressible soils is complete or 450 days which ever is less.

All instruments constructed under this contract shall be abandoned after is has been determined that consolidation beneath the surcharge loads has been completed, or at a time directed by the Contracting Officer. Abandonment includes damaged instruments which cannot be returned to service. Abandonment procedures shall include removal of protective casings at least five (5) feet below the finished ground surface, installing a permanent water-tight cover on the top of the casings, and suitably back filling the over excavation with controlled earth fill.

The Contractor may, at his option and expense, elect to measure settlement of the foundation outside the required settlement ranges shown on the drawings. If the Contractor chooses to measure settlement of the foundation outside the required settlement ranges shown on the drawings, a plan for measuring the settlement shall be included in his Plan of Operations for approval. Failure to measure settlement in strict accordance with an approved plan will result in total forfeiture of any payment which would otherwise be due the Contractor for settlement of the foundation.

3.11 PLACEMENT AND SPREADING

3.11.1 General

No fill shall be placed on any part of the embankment foundation until such areas have been inspected and given final approval by the Contracting Officer.

3.11.1.1 Gradation and Distribution

The gradation and distribution of materials throughout each zone of the levee and railroad embankment shall be such that the embankment will be free from lenses, pockets, streaks, and layers of material differing substantially in texture or gradation from surrounding material of the same class. If lenses, pockets, or layers of materials differing substantially in texture or gradation from surrounding material occur in the spread material, the layer shall be mixed by harrowing or any other approved method to blend the materials. During the placing and spreading process, the Contractor shall maintain at all times a force of workers adequate to remove all roots, debris, and oversize stone from all embankment materials. All stones and rock fragments larger than 3 inches in any dimension shall be removed from the fill. No fill shall be placed upon a frozen surface, nor shall snow, ice, or frozen earth be incorporated in the embankment.

3.11.1.2 Foundations and Partial Embankment Fills

The foundations and all partial embankment receiving fills shall be kept thoroughly drained. Placing operations will be such as to avoid mixing of materials from adjacent sections as much as practicable.

3.11.1.3 Equipment Traffic

Equipment traffic on any embankment zone shall be routed to distribute the compactive effort as much as practicable. Ruts formed in the surface of any layer of spread material will be filled before that material is compacted. If, in the opinion of the Contracting officer, the compacted surface of any layer of material is too smooth to bond properly with the succeeding layer, the surface shall be loosened by scarifying or other approved methods before material from the succeeding layer is placed.

3.11.2 Placement on Surfaces Containing Frozen Materials

Embankment shall not be placed on a foundation which contains frozen material. This prohibition encompasses all foundation types, including the natural ground, all prepared subgrades (whether in an excavation or on an embankment), and all layers of previously placed and compacted earth fill which become the foundations for successive layers of earth fill. All material that freezes or has been subjected to freeze-thaw action during the construction work, or during periods of temporary shutdowns, such as, but not limited to nights, holidays, weekends, or winter shutdowns of earthwork operations, shall be removed to a depth that is acceptable to the Contracting Officer and replaced with new material. Alternatively, the material shall be thawed, dried, reworked and recompacted to the specified criteria before additional material is placed. The Contracting Officer will determine when placement of fill shall cease due to cold weather. The Contracting Officer may elect to use average daily air temperatures, and/or physical observation of the soils for the determination. Levee and railroad embankment material shall not contain frozen clumps of soil, snow or ice.

3.11.3 Placement of Embankment and Backfill Against Concrete Structures

Backfill material around utilities and concrete structures shall consist of cohesive material, select granular material, or other initial backfill material as required and shown in the contract drawings. Bedding and initial backfill material on the landward two-thirds length of pipes penetrating the levee shall be select granular material with a minimum of 18 inches in thickness. Bedding and initial backfill material on the riverward third of pipes penetrating the levee shall be cohesive material. The remainder of the trench, except for special materials for roadways and railroads, shall be filled and compacted with material according to the appropriate fill zone as shown in the drawings. Compaction by water flooding or jetting will not be permitted. This requirement shall also apply to all other areas not specifically designated. Backfill shall be placed in layers not exceeding 4 inches loose thickness for compaction by hand operated machine compactors, and 6 inches loose thickness for other than hand operated machines, unless otherwise specified. No embankment or backfill shall be placed on or against concrete less than 7 days after placement or 70 percent of the design strength, without prior approval of the Contracting Officer.

3.11.4 Backfill for Appurtenances

After the catch basin, inlet, or similar structure has been constructed and the concrete has been allowed to cure for 7 days, backfill shall be placed in such a manner that the structure will not be damaged by the shock of falling earth. The backfill material shall be placed and compacted as specified for structures, and shall be brought up evenly on all sides of the structure to prevent eccentric loading and excessive stress.

3.11.5 Random Fill

Except for the surcharge zone, random fill material shall be placed and spread in layers not more than 6 inches in uncompacted thickness. Layers should be started full out to the slope stakes and shall be carried substantially horizontal and parallel to the levee centerline with sufficient crown or slope to provide satisfactory drainage during construction.

Random fill in the surcharge zone shall be placed and spread in maximum 24-inch lifts.

3.11.6 Impervious Fill

Impervious fill material shall be placed and spread in layers not more than 6 inches in uncompacted thickness. Layers should be started full out to the slope stakes and shall be carried substantially horizontal and parallel to the levee centerline with sufficient crown or slope to provide satisfactory drainage during construction.

3.11.7 Railroad Fill

Railroad fill material shall be placed and spread in layers not more than 6 inches in uncompacted thickness. Layers should be started full out to the slope stakes and shall be carried substantially horizontal and parallel to

the levee centerline with sufficient crown or slope to provide satisfactory drainage during construction.

3.11.8 Working Platform

In lieu of dewatering as required in paragraph: Drainage, the Contractor may at his option construct a working platform for the underwater portion of required fills. Working platforms shall be constructed so as to produce a firm dense surface upon which to place the specified fill. Fills constructed on a working platform shall meet the requirements specified in paragraphs: Drainage, PLACEMENT AND SPREADING, MOISTURE CONTROL and COMPACTION. Specific requirements for working platforms constructed riverward and landward of the centerline of the levee are defined below.

3.11.8.1 Working Platform Riverward of Levee Centerline

If the contractor elects to construct working platforms riverward of the levee centerline, the working platform shall be constructed utilizing material according to the appropriate fill zone. Working platforms riverward of the levee centerline shall be constructed to an elevation not more than two feet above the surface of the water. Fill for construction of the working platform in areas of standing water shall be placed in a bullnose configuration using a crawler type tractor. The portion of the working platform which is above the water surface shall be placed in lifts not to exceed twelve (12) inches and shall be traffic compacted by four complete passes of the construction equipment. Working platforms shall be placed to produce a firm, dense surface upon which to place the specified fill. The Contractor may also elect to use geogrid or other forms of reinforcement that have been approved by the Contracting Officer in efforts to achieve compaction. Required fills constructed on a working platform shall meet the requirements specified in paragraphs: Drainage, PLACEMENT AND SPREADING, MOISTURE CONTROL and COMPACTION.

3.11.8.2 Working Platform Landward of Levee Centerline

If the contractor elects to construct working platforms landward of the levee centerline, the working platforms shall be constructed utilizing working platform/stabilization material. Fill in areas of standing water shall be placed in a bullnose configuration using tracked equipment. For portions of the working platform above the water surface, the working platform/stabilization material shall be traffic compacted in successive eight (8) to twelve (12) inch lifts until the aggregate interlock is such that there is no further displacement. The Contractor may also elect to use geogrid or other forms of reinforcement that have been approved by the Contracting Officer. The Contractor shall construct the working platform to an elevation that will allow Railroad Fill to be placed to meet the specified moisture and compaction requirements. If the moisture and compaction requirements are not met for the first lift of Railroad Fill placed above the working platform, the Contract shall remove all Railroad fill that does not meet the specified requirements and extend or modify the working platform in order to allow for fill placed on the working platform to meet the specified requirements. Working platform/stabilization material shall not be placed within thirty-six (36) inches of the proposed embankment finished grade.

3.11.9 Topsoil

Topsoil material to be placed within the outer face of the appropriate fill surface and shall be placed as follows: fill zones comprised of

cohesionless material shall have 12 inches of topsoil placed to the finish grade as shown on the contract drawings. Fill zones comprised of cohesive material shall have 6 inches of topsoil placed to the finish grade as shown on the contract drawings. Topsoil shall be 18 inches in thickness in areas as shown on sheet C5.2 of the contract drawings. Topsoil shall only be placed where vegetative cover is scheduled. Topsoil shall not be placed in more than an 12 inch loose lift thickness.

3.12 MOISTURE CONTROL

Materials being placed as fill shall be within the moisture content limits for the respective material type. Materials that are not within the specified moisture content limits either before or after compaction shall be reworked and the moisture content adjusted to obtain a moisture content within the specified range. Surfaces to receive fill shall be monitored for moisture content. Whenever the surface to receive fill is either too dry or too wet, the moisture content of the surface shall be appropriately adjusted prior to placing the next fill lift.

3.12.1 Impervious Fill

The moisture content after compaction shall be within the limits of 3 percentage points above optimum to 2 percentage point below optimum moisture content as determined by ASTM D 698.

3.12.2 Random Fill

Except for the surcharge zone, the moisture content for random material to be placed in a fill zone shall be within the limits of 2 percentage points below optimum to 3 percentage points above optimum for cohesive material or adequate moisture to achieve 70% relative density for cohesionless material as set forth in ASTM D 4253 and ASTM D 4254.

Random fill in the surcharge zone shall be placed at natural moisture content of the materials utilized.

3.12.2.1 Railroad Fill

The moisture content after compaction shall be within the limits of 3 percentage points above optimum to 3 percentage point below optimum moisture content as determined by ASTM D 698.

3.12.2.2 Topsoil

The moisture content for the topsoil material to be placed shall be such that compactive effort is kept to a minimum yet sufficient to hold the soil together and support vegetative cover.

3.13 COMPACTION

3.13.1 Compaction Equipment

Compaction equipment shall conform to the following requirements and shall be used as prescribed in subsequent paragraphs.

3.13.1.1 Tamping Rollers

Tamping rollers shall be as follows:

a. Towed -Tamping rollers shall consist of a heavy duty double drum unit, with a drum diameter not less than 60 inches, and an individual drum length of not less than 60 inches. The drums shall be capable of being ballasted with water or a combination of sand and water. Each drum shall have staggered feet uniformly spaced over the cylindrical surface such as to provide approximately three tamping feet for each two square feet of drum surface. The tamping feet shall be 7 to 9 inches in clear projection from the cylindrical surface of the roller and shall have a face area of not less than 5 square inches nor more than 7 square inches. The roller shall be equipped with cleaning fingers, so designed and attached as to prevent the accumulation of material between the tamping feet, and these cleaning fingers shall be maintained at their full length throughout the periods of use of the roller. The weight of the roller shall not be less than 3500 pounds per foot of linear drum length weighted, and shall not be more than 2000 pounds per foot of drum length empty. The two drums comprising one roller unit shall be yoked such that they will oscillate when traversing uneven surfaces. The design and operation of the tamping roller shall be subject to the approval of the Contracting Officer who shall have the right at any time during the prosecution of the work to direct such repairs to the tamping feet, minor alterations in the roller and variations in the weight as may be found necessary to secure optimum compaction of the earth fill materials. The Contractor may be required to add ballast to the roller to the maximum capacity specified by the manufacturer of the roller. The roller shall be drawn by a crawler-type tractor at a speed not to exceed 3.5 miles per hour. If tamping rollers are used in tandem, not more than two rollers in tandem will be permitted and in such case, one trip of the tandem rollers over any surface will be considered as two passes. When tamping rollers are used in tandem, the tamper foot spacing shall be offset so that the circumferential rows on the rear drums are in line with the mid-point of the circumferential rows on the forward drums.

b. Self-propelled - Self-propelled tamping rollers may be used in lieu of tractor drawn tamping rollers provided the foot pressure on the tamping feet of the self-propelled roller are approximately the same as the foot pressure on the towed roller. For self-propelled rollers steered with rubber-tired wheels, the tire pressure shall not exceed 40 pounds per square inch. Self-propelled rollers shall be operated at speeds not exceeding 3.5 miles per hour. The Contracting Officer has the authority to limit or eliminate the use of self-propelled rollers if they are found to cause shearing or laminations of the compacted fill.

3.13.1.2 Vibratory Rollers

Vibratory rollers for compacting rock fills, pervious sand and gravel fills, or filter and transition drainage layers shall be equipped with a smooth steel compaction drum and shall be operated at a frequency of vibration during compaction operations between 1100 and 1500 vpm. Vibratory rollers may be either towed or self-propelled and shall have an unsprung drum weight that is a minimum of 60 percent of the rollers' static weight. Towed rollers shall have at least 90 percent of their weight transmitted to the ground through the compaction drum when the roller is standing in a level position hitched to the towing vehicle. Rollers for compacting rockfill, or sand and gravel fills shall have a minimum static weight of 20,000 pounds, a minimum dynamic force of 40,000 pounds when operating at 1400 vpm, and an applied force not less than 9,000 pounds per foot of compaction drum length. Rollers for compacting sand and gravel

fills or filter and drainage layers shall have a minimum static weight of 8,000 pounds, a minimum dynamic force of 16,000 pounds when operating at 1400 vpm, and an applied force not less than 5,000 pounds nor greater than 9,000 pounds per foot of compaction drum length. The level of amplitude and vibration frequency during compaction will be maintained uniform throughout the embankment zone within which it is operating. Rollers shall be operated at speeds not to exceed 1.5 mph. The equipment manufacturer shall furnish sufficient data, drawings, and computation for verification of the above specifications, and the character and efficiency of this equipment shall be subject to approval.

3.13.1.3 Hand Operated Compactors

Compaction of material, in areas where it is impracticable to use a roller or tractor compaction shall be performed by the use of approved hand operated power compactors.

a. Power Tampers: Power tampers shall be hand operated equipment capable of compacting material in confined areas. The compactors shall be either an internal combustion or pneumatic activated tamper. Tampers shall have sufficient weight and striking power to produce the specified compaction. The character and efficiency of this equipment shall be subject to the approval of the Contracting Officer.

b. Vibratory Plate Compactor: Vibratory compactors operated by hand in confined areas shall utilize the oscillating cam principal and shall deliver an impact of not less than 2000 pounds at a rate of approximately 2000 impulses per minute. The character and efficiency of this equipment shall be subject to the approval of the Contracting Officer.

3.13.1.4 Crawler-type Tractors

Crawler-type tractors used for spreading or compaction shall weigh not less than 20,000 pounds, shall exert a unit tread pressure of not less than 6 pounds per square inch, and shall not be operated at a speed to exceed 3.5 miles per hour.

3.13.1.5 Sprinkling Equipment

Sprinkling equipment shall consist of tank trucks, pressure distributors or other equipment designed to apply water uniformly and in controlled quantities to variable width of surface.

3.13.1.6 Miscellaneous Equipment

Scarifiers, disks, spring-tooth or spike-tooth harrows, spreaders, and other equipment shall be suitable for use in embankment construction and approved by the Contracting Officer. Equipment used for blending fill material shall be capable of penetrating the full loose lift thickness of the specific material type.

3.13.2 Compaction of Impervious Fill

Impervious fill shall consist of cohesive material. When the moisture content and the condition of the layer are satisfactory, the lift shall be compacted to a minimum of 95 percent of the maximum dry density as determined by the Contractor in accordance with ASTM D 698 with not less than six complete coverages of an approved tamping roller traversing in a

direction parallel to the axis of the levee. In areas which are not accessible by roller, the fill shall be placed in layers not more than 4 inches in uncompacted depth and compacted with an approved hand operated compactor to a density equal to that obtained in other areas which are accessible to rollers. Dumping, spreading, sprinkling, and compacting may be performed at the same time at different points along a section when there is sufficient area to permit these operations to proceed simultaneously. Compaction equipment shall be operated such that the strip being traversed by the roller shall overlap the rolled adjacent strip by not less than 3 feet.

3.13.3 Compaction of Random Fill

If Random Fill consists of cohesive materials, and the moisture content and the condition of the layer are satisfactory, the lift shall be compacted to a minimum of 95 percent of the maximum dry density as determined by the Contractor in accordance with ASTM D 698 with not less than six complete coverages of an approved tamping roller traversing in a direction parallel to the axis of the levee. In areas which are not accessible by roller, the fill shall be placed in layers not more than 4 inches in uncompacted depth and compacted with an approved hand operated compactor to a density equal to that obtained in other areas which are accessible to rollers. Dumping, spreading, sprinkling, and compacting may be performed at the same time at different points along a section when there is sufficient area to permit these operations to proceed simultaneously. Compaction equipment shall be operated such that the strip being traversed by the roller shall overlap the rolled adjacent strip by not less than 3 feet. If random fill consists of cohesionless material, and the moisture content and the condition of the layer are satisfactory, the lift shall be compacted to a minimum of 70 percent of relative density in accordance with ASTM D 4253 and ASTM D 4254. In areas which are not accessible by roller, the fill shall be placed in layers not more than 4 inches in uncompacted depth and compacted with an approved hand operated compactor to a density equal to that obtained in other areas which are accessible to rollers. Dumping, spreading, sprinkling, and compacting may be performed at the same time at different points along a section when there is sufficient area to permit these operations to proceed simultaneously. Compaction equipment shall be operated such that the strip being traversed by the roller shall overlap the rolled adjacent strip by not less than 3 feet. Random fill may be placed uncompacted in the following locations:

-STA 7764+00 to STA 7771+00 (Includes only fill placed from 100' riverside of the levee centerline to 150' landward of the proposed Spring Creek centerline.)

-STA 7800+00 to STA 7806+00 (Includes only fill placed from 100' riverside of the levee centerline to the riverward edge of fill.)

-STA 7845+00 (1000'RT) +/- to STA 7855+00 (400'RT) +/- (includes only fill placed for grading of existing railroad embankment.)

3.13.4 Compaction of Railroad Fill

If railroad fill consists of cohesive material,and the moisture content and the condition of the layer are satisfactory, the lift shall be compacted with not less than six complete coverages of an approved tamping roller traversing in a direction parallel to the axis of the levee. Railroad fill shall be compacted to a minimum of 95 percent of the maximum dry density in accordance with ASTM D 698 . In areas which are not accessible by roller, the fill shall be placed in layers not more than 4 inches in uncompacted depth and compacted with an approved hand operated compactor to a density

equal to that obtained in other areas which are accessible to rollers. Dumping, spreading, sprinkling, and compacting may be performed at the same time at different points along a section when there is sufficient area to permit these operations to proceed simultaneously. Compaction equipment shall be operated such that the strip being traversed by the roller shall overlap the rolled adjacent strip by not less than 3 feet.If railroad fill consists of cohesionless material, and the moisture content and the condition of the layer are satisfactory, the lift shall be compacted to a minimum of 70 percent of relative density in accordance with ASTM D 4253 and ASTM D 4254. In areas which are not accessible by roller, the fill shall be placed in layers not more than 4 inches in uncompacted depth and compacted with an approved hand operated compactor to a density equal to that obtained in other areas which are accessible to rollers. Dumping, spreading, sprinkling, and compacting may be performed at the same time at different points along a section when there is sufficient area to permit these operations to proceed simultaneously. Compaction equipment shall be operated such that the strip being traversed by the roller shall overlap the rolled adjacent strip by not less than 3 feet

3.13.5 Topsoil

Topsoil shall be compacted by one pass over each loose lift (as required) with a cultipacker, roller, or other approved equipment weighing 100 to 160 pounds per linear foot of roller.

3.13.6 Compaction Adjacent to Concrete Structures and Utilities

Hand compaction shall be required around each structure and at least 24" above each structure. Each layer shall be compacted to at least 95 percent maximum density for cohesive soils and to a minimum of 70 percent relative density in accordance with ASTM D 4253 and ASTM D 4254 for cohesionless soils, unless otherwise specified. Crawler-type tractors, vibratory equipment and other similar heavy compaction equipment shall not be used within 4 feet of any completed or partially completed structure. Compaction within 4 feet of completed or partially completed structures, including bridge piers, shall be accomplished by the use of mechanical hand tampers, vibrating plates, or other approved methods and equipment. Care shall be taken to ensure thorough compaction of the fill under the haunches of the pipe. The Contractor shall ensure that compaction operations do not damage any existing utilities. Any damage caused by the Contractor's operation shall be repaired at the Contractor's expense.

3.13.6.1 Replacement of Unyielding Material

Unyielding material removed from the bottom of the trench shall be replaced with select granular material or initial backfill material.

3.13.6.2 Replacement of Unstable Material

Unstable material removed from the bottom of the trench or excavation shall be replaced with select granular material placed in layers not exceeding 6 inches loose thickness.

3.14 FIELD QUALITY CONTROL

3.14.1 Excavation

The Contractor shall establish and maintain quality control for excavation

operations to assure compliance with contract requirements, and maintain records of the Contractor's quality control for all construction operations including but not limited to the following:

a. Lines, grades and tolerances,

b. Segregation of materials,

c. Disposal and/or stockpiling of materials,

d. Unsatisfactory materials,

e. Conditions that may induce seepage or weaken the foundation or embankment,

f. Stability of excavations.

Records of inspections and tests, as well as the records of corrective actions taken, shall be furnished to the Government in accordance with Section 01451 CONTRACTOR QUALITY CONTROL.

3.14.2 Embankment

3.14.2.1 General

The Contractor shall establish and maintain field quality control for foundation preparation, embankment and backfill operations to assure compliance with contract requirements and maintain detailed records of field quality control for all operations including but not limited to the following:

a. Earthwork Equipment

Type, size, number of units and suitability for construction of the prescribed work.

b. Foundation Preparation

Methods of preparing the foundations in advance of embankment and backfill construction and methods for providing drainage of the foundation and partially completed fills.

3.14.2.2 Materials Testing

The contractor shall perform sufficient testing to insure that the fill is being constructed as specified. The testing program specified below shall be considered the minimum acceptable frequency of testing. This does not relieve the Contractor from the responsibility of performing additional testing, if required to ensure compliance with these specifications. Test results shall be certified by a registered professional engineer. These certifications shall state that the tests and observations were performed by or under the direct supervision of the registered professional engineer and that the results are representative of the materials or conditions being certified by the tests.

a. Soil Classification Tests

Soil classification tests shall be performed in accordance with ASTM D 2487. One initial classification test shall be required

for each different classification of material to be utilized as embankment fill or backfill. As prescribed in ASTM D 2487, and Atterberg limits in accordance with ASTM D 4318 shall be performed on each different classification. The Contractor shall submit additional tests for every 50000 cubic yards of embankment or backfill material. Soil classification tests shall be performed on foundation material as required to determine the acceptability of the in-situ soils. Additional tests will be required if noticeable changes in the material occur.

b. Cohesive Material Testing

(1) Moisture Density Relationships. The moisture-density relations for each different classification of cohesive material utilized shall be determined in accordance with ASTM D 698, . Prior to placing any fill material containing cohesive material, a minimum of (5) five-point compaction test shall be performed on representative samples of the material to be used as fill. Additional tests will be required each time a new material is encountered. The moisture-density curves will be compiled to form a family of curves which will be utilized to estimate optimum properties (maximum dry density and optimum moisture content) to be used with field density test.

(2) Water (Moisture) Content Tests. Determination of water content shall be performed in accordance with ASTM D 3017. One water content test will be performed for each 1000 cubic yards of material placed or each lift of material whichever is less. Backfill and fills not meeting the required specifications for water content shall be retested after corrective measures have been applied.

(3) In-place Density Testing for Cohesive Materials. The in-place density of the cohesive materials shall be determined in accordance with ASTM D 1556, ASTM D 2167, ASTM D 2922. At least one (1) in-place density test shall be performed on every 1000 cubic yards of completed fill or one (1) each day of fill placement, whichever is more frequent, with the horizontal locations randomly staggered in the fill. For use with the family of curves to determine the optimum properties of the material a one-point compaction tests shall be performed in conjunction with each in-place density. Fill not meeting the required specifications for in-place density shall be retested after additional compaction has been completed. When nuclear method is used for in-place density testing according to ASTM D 2922 and ASTM D 3017, the first test and every tenth test thereafter for each material type shall include a sand cone correlation test in accordance with ASTM D 1556. The sand cone test shall be performed adjacent to the location of the nuclear test, shall include a nominal 6 inch diameter sand cone, and shall include a minimum wet soil weight of 6 pounds extracted from the hole. Nuclear density testing equipment shall not be used during rain. The density correlations shall be submitted with test results. Each transmittal including density test data shall include a summary of all density correlations for the job neatly prepared on a summary sheet including at a minimum:

(i) Meter serial number and operators initials.
(ii) Standard count for each test.

(iii) Material type.
(iv) Probe depth.
(v) Moisture content by each test method and the deviation.
(vi) Wet density by each test method and the deviation.

c. Cohesionless Material Testing

(1) Compaction Tests. The Contractor shall run not less than one relative density test for every 5000 cubic yards of cohesionless fill in accordance with ASTM D 4253 and ASTM D 4254.

(2) In-Place Density Tests. The in-place density of the cohesionless materials shall be determined in accordance with ASTM D 1556, ASTM D 2167, ASTM D 2922. The Contractor shall run not less than one (1) field in-place density test on each lift of material or every 1000 cubic yards of completed embankment fill or backfill whichever is less. Horizontal locations shall be randomly staggered in the fill. When nuclear method is used for in-place density testing according to ASTM D 2922 and ASTM D 3017, the first test and every tenth test thereafter for each material type shall include a sand cone correlation test in accordance with ASTM D 1556. The sand cone test shall be performed adjacent to the location of the nuclear test, and shall include a nominal 6 inch diameter sand cone, and shall include a minimum wet soil weight of 6 pounds extracted from the hole. The density correlations shall be submitted with test results. Each transmittal including density test data shall include a summary of all density correlations for the job neatly prepared on a summary sheet including at a minimum:

(i) Meter serial number and operators initials.
(ii) Standard count for each test.
(iii) Material type.
(iv) Probe depth.
(v) Moisture content by each test method and the deviation.
(vi) Wet density by each test method and the deviation.

(3) Water (Moisture) Content Tests. Determination of water content shall be performed in accordance with ASTM D 2216. One water content test will be performed for each 1000 cubic yards of material placed. Backfill and fills not meeting the required specifications for water content shall be retested after corrective measures have been applied.

d. Additional Testing

The Contracting Officer may request additional tests if there is reason to doubt the adequacy of the compaction, or special compaction procedures are being used, or materials change or if the Contracting Officer determines that the Contractor's testing is inadequate or the Contractor is concentrating backfill and fill operations in a relatively small area.

3.14.2.3 Materials Testing Around Structures

Tests around structures shall be performed in sufficient numbers to ensure that the specified density is being obtained. A minimum of one field density test per foot of backfill for every 200 feet of installation shall be performed. At minimum one test per day shall be performed. Field

in-place density shall be determined in accordance with ASTM D 1556 or ASTM D 2167 or ASTM D 2922. When ASTM D 2922 is used, the calibration curves shall be checked and adjusted using the sand cone method as described in paragraph Calibration of the ASTM publication. ASTM D 2922 results in a wet unit weight of soil and when using this method, ASTM D 3017 shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall be checked along with density calibration checks as described in ASTM D 3017. The calibration checks of both the density and moisture gauges shall be made at the beginning of a job, on each different type of material encountered, at intervals as directed by the Contracting Officer. At least one field density test performed in accordance with ASTM D 1556 shall be made daily and used as a check of the results obtained with ASTM D 2922 or ASTM D 3017. Copies of calibration curves, results of calibration tests, and field and laboratory density tests shall be furnished to the Contracting Officer. Trenches improperly compacted shall be reopened to the depth directed, then refilled and compacted to the density specified at no additional cost to the Government.

3.14.2.4 Displacement of Sewers

After other required tests have been performed and the trench backfill compacted to the finished grade surface, the pipe shall be inspected to determine whether significant displacement has occurred. This inspection shall be conducted in the presence of the Contracting Officer. Pipe sizes larger than 36 inches shall be entered and examined, while smaller diameter pipe shall be inspected by shining a light or laser through pipe, or by the use of television cameras passed through the pipe. If, in the judgement of the Contracting Officer, the interior of the pipe shows poor alignment or any other defects that would cause improper functioning of the system, the defects shall be remedied as directed at no additional cost to the Government.

3.14.2.5 Reporting

On a daily basis, the Contractor shall furnish the inspection records and all material testing results, the quantity of fill placed, as well as the records of corrective action taken, in accordance with Section 01451 CONTRACTOR QUALITY CONTROL.

-- End of Section --